

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number
WO 2004/015959 A3

- (51) International Patent Classification⁷: **H04Q 7/38**
- (21) International Application Number:
PCT/NZ2003/000176
- (22) International Filing Date: 8 August 2003 (08.08.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
520650 8 August 2002 (08.08.2002) NZ
- (71) Applicant (for all designated States except US): **TAIT ELECTRONICS LIMITED** [NZ/NZ]; 558 Wairakei Road, Burnside, Christchurch (NZ).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **BUSCH, Adrian, David** [NZ/NZ]; 40 Hills Road, Christchurch (NZ). **CHURTON, Paul, Anthony** [NZ/NZ]; 64 Colman Avenue, Sockburn, Christchurch (NZ). **KUO, Shyh-hao**

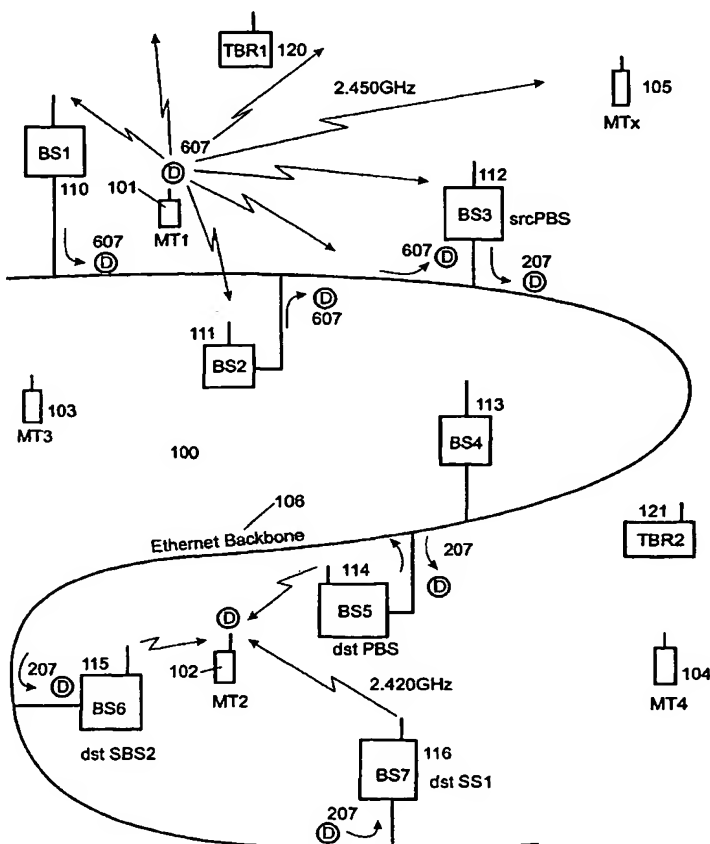
[NZ/NZ]; 35 Garreg Road, Fendalton, Christchurch (NZ). **LENDNAL, Stefan, John** [NZ/NZ]; 99 Stanbury Street, Spreydon, Christchurch (NZ). **MEHROTRA, Kishore** [IN/NZ]; 1/7 Brake Street, Upper Riccarton, Christchurch (NZ). **McCONNELL, Douglas, Andrew** [NZ/NZ]; 111 Gardiners Road, Harewood, Christchurch (NZ). **McLOUGHLIN, Ian, Vince** [GB/NZ]; 27 Springbank Street, Bryndwr, Christchurch (NZ). **POW, Iain, Murdoch** [NZ/NZ]; 22 Aintree Street, Bishopdale, Christchurch (NZ). **SCOTT, Tomas, Gregory** [NZ/NZ]; 4 Kingston Place, Harewood, Christchurch (NZ). **SPALDING, David, Ian** [AU/NZ]; 59 Woodside Common, Westmorland, Christchurch (NZ).

(74) Agents: **WEST-WALKER, Gregory, J. et al.**; A J Park, 6th Floor Huddart Parker Building, Post Office Square, PO Box 949, 6015 Wellington (NZ).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

[Continued on next page]

(54) Title: IMPROVEMENTS RELATING TO RADIO COMMUNICATION SYSTEMS



(57) Abstract: A communications system including a plurality of base station transceivers linked by some means over which the base station transceivers communicate, a plurality of mobile transceivers adapted to communicate via the base station transceivers using macrodiversity, and wherein the mobile transceivers are further adapted to control allocation of system resources to enable communication.



CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

- (88) Date of publication of the international search report:

1 April 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2003/000176

A. CLASSIFICATION OF SUBJECT MATTERInt. Cl. ⁷: H04Q 7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT, USPTO, Esp@cenet: communication, mobile, phone, base station, macro diversity, channel, allocate, control, signal, estimate, compare, synchronisation, clock, error, adjust, resource, uplink, downlink, usage, payload, sequence, correction code and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2001/099303A2 (QUALCOMM INCORPORATED), 27 December 2001 page 7, line 26 - page 8, line 18	1 at least
X	WO 1998/008353A2 (NOKIA TELECOMMUNICATIONS OY), 26 February 1998 page 7, lines 20-34	1 at least
A	WO 2000/076251A1 (IPMOBILE INCORPORATED), 14 December 2000 whole document	1 - 74
A	WO 2000/022866A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 20 April 2000 whole document	1 - 74

☒ Further documents are listed in the continuation of Box C
 ☒ See patent family annex

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

 Date of the actual completion of the international search
 13 February 2004

 Date of mailing of the international search report
 24 FEB 2004

 Name and mailing address of the ISA/AU
 AUSTRALIAN PATENT OFFICE
 PO BOX 200, WODEN ACT 2606, AUSTRALIA
 E-mail address: pct@ipaustralia.gov.au
 Facsimile No. (02) 6285 3929

 Authorized officer

MANISH RAJ
 Telephone No : (02) 6283 2175

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2003/000176

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E, A	Patent Abstracts of Japan, JP 2003-270333A (TOYOTA CENTRAL RES & DEV LAB INC), 25 September 2003 abstract	75, 84, 85
A	WO 2000/035140A1 (ERICSSON INC.), 15 June 2000 page 2, lines 10-22	75, 84, 85
A	WO 2002/001775A1 (NOKIA MOBILE PHONES LTD), 3 January 2002 whole document	86, 94, 101
A	EP 991216A2 (HEWLETT-PACKARD COMPANY), 5 April 2000 whole document	86, 94, 101
P, A	WO 2002/091597A2 (QUALCOMM INCORPORATED), 14 November 2002 whole document	108, 110, 112
A	WO 2001/099454A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 27 December 2001 whole document	108, 110, 112
A	EP 1206040A2 (AGERE SYSTEMS GUARDIAN CORPORATION), 15 May 2002 whole document	114
A	US 5870412A (SCHUSTER et al), 9 February 1999 whole document	114

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2003/000176

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos : 113 and 116 - 119
because they relate to subject matter not required to be searched by this Authority, namely:
These claims have been found to be unsearchable under Article 17(2)(b)
2. ☐ Claims Nos :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Refer to the attached sheet...

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.☒ No protest accompanied the payment of additional search fees.

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No. II (Unity of Invention is lacking):

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are *five (5)* different inventions as follows:

1. Claims 1-74 are directed to "*a communications system*" including the following features:

- (i) a plurality of base station receivers,
- (ii) a plurality of mobile transceivers,
- (iii) the mobile transceivers are further adapted to control allocation of system resources to enable communication.

It is considered that "*controlling allocation of system resources*" comprises a first "special technical feature".

2. Claims 75-85 are directed to "*a method of estimating a transition in a signal*" including the following features:

- (i) sampling an incoming signal,
- (ii) comparing the sample levels of samples within the first group of samples,
- (iii) comparing the sample levels of samples within the second group of samples,
- (iv) comparing the sample level of a middle sample with an adjacent middle sample,
- (v) estimating a transition point in the signal from the comparisons.

It is considered that "*estimating a transition point in the signal from the comparisons*" comprises a second "special technical feature".

3. Claims 86-107 are directed to "*a method of synchronising the clocks of a first node and a second node in a network*" including the following features:

- (i) sending a first synchronisation message from the first node to the second node,
- (ii) sending a second synchronisation message from the second node to the first node,
- (iii) determining a first difference as the difference between the time the first message was sent and when the first message was received,
- (iv) determining a second difference as the difference between the time the second message was sent and when the second message was received,
- (v) determining a clock error as the average of the difference between the first and second differences, and
- (vi) adjusting the clock of either the first node or the second node by the clock error.

It is considered that "*adjusting the clock of either the first node or the second node by the clock error*" comprises a third "special technical feature".

4. Claims 108-112 are directed to "*a method of allocating communication resources for a mobile terminal in a communications system that utilises a base station network*" including the following features:

- (i) identifying uplink channel usage,
- (ii) identifying one or more spare uplink channels, and
- (iii) transmitting over the one or more identified channels without negotiation with the base station.

It is considered that "*transmitting over the one or more identified channels without negotiation with the base station*" comprises a fourth "special technical feature".

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No. II (Unity of Invention is lacking):

5. Claims 114-115 are directed to "*a communications system in which data is transmitted in packets*" including the following features:

- (i) before transmitting data a transmitter provides a distinction between payload sequences and synchronisation sequences in the signal by scanning the payload sequence,
- (ii) introducing errors into the portions of the payload sequence, and
- (iii) the introduced errors are within an error correction capability of a payload error correction code.

It is considered that "*scanning the payload sequence and introducing errors into the portions of the payload sequence*" comprises a fifth "special technical feature".

Since the above mentioned groups of claims do not share any of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept, a priori.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/NZ2003/000176

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member		
WO	2001/099303	AU	70009/01	EP	1295407
WO	1998/008353	AU	39440/97		
WO	2000/076251	AU	56098/00		
WO	2000/022866	AU	14229/00	EP	1121829
JP	2003270333				
WO	2000/035140	AU	19340/00	EP	1138136
				US	6314148
WO	2002/001775	AU	70572/01	EP	1295420
		US	2002031196	GB	2364203
EP	0991216	JP	2000115210	US	6665316
WO	2002/091597	EP	1384334	US	2003013451
WO	2001/099454	AU	74749/01	SE	0002285
EP	1206040	JP	2002204219		
US	5870412	AU	30628/99	CA	2313330
		US	6145109	EP	1040611
		US	6226769	US	6170075
		WO	9930462	US	6487690
END OF ANNEX					